

**WHAT IS CLAIMED IS:**

1. A liquid pressurizing device comprising:  
a reciprocating pump for pressurizing and delivering a high pressure liquid  
5 through reciprocating motion of a plurality of plungers;  
pressure measuring means for measuring an actual delivery pressure value of  
said high pressure liquid;  
pressure control means for adjusting a feed rate of reciprocating motion of said  
plungers so that the actual delivery pressure value measured by said pressure  
10 measuring means is converged to a preset pressure value as a desired value;  
means for determining an optimum feed rate of the reciprocating motion of the  
plurality of plungers after the actual delivery pressure value reaches a predetermined  
threshold; and  
means for maintaining the feed rate of the reciprocating motion of the plurality  
15 of plungers at said optimum feed rate.

2. A liquid pressurizing device according to claim 1, wherein said pressure  
control means comprises a proportional control means for performing, after the actual  
delivery pressure value has reached the predetermined threshold, the proportional  
20 control of the actual delivery pressure value during a time until the plungers first reach  
a forward stroke end thereof.

3. A liquid pressurizing device according to claim 1, wherein after said  
optimum feed rate has been determined, said pressure control means corrects the feed  
25 rate on the basis of the deviation between the actual delivery pressure value and said  
preset pressure value when the direction of the reciprocating motion of the plungers is  
changed.

4. A liquid pressurizing device according to claim 1, wherein after said  
30 optimum feed rate has been determined, said pressure control means temporarily sets  
the feed rate to a rate higher than said optimum feed rate when the direction of  
reciprocating motion of the plungers is changed.

5. A liquid pressurizing device comprising:  
35 a reciprocating pump for pressurizing and delivering a high pressure liquid  
through the reciprocating motion of a plurality of plungers;

pressure measuring means for measuring an actual delivery pressure value of said high pressure liquid;

a nozzle for injecting said high pressure liquid;

5 pressure control means for adjusting the feed rate of reciprocating motion of said plungers so that the actual delivery pressure value measured by said pressure measuring means is converged to a preset pressure value as a desired value;

detecting means for detecting an injection state and a suspension state of said high pressure liquid from said nozzle;

10 means for determining an optimum feed rate of the reciprocating motion of the plurality of plungers after the actual delivery pressure value reaches a predetermined threshold; and

means for maintaining the feed rate of the reciprocating motion of the plurality of plungers at said optimum feed rate, wherein said pressure control means is responsive to the detection of the suspension state by said detecting means to stop the movement of said plungers when said preset pressure value is nearly reached.

20 6. A liquid pressurizing device according to claim 5, wherein said pressure control means is responsive to the detection of the suspension state by said detecting means to stop the movement of said plungers and is responsible to the detection of a reinjection by said detecting means to effect the movement of said plungers at said optimum fee rate.

7. A liquid pressurizing device comprising:

25 a reciprocating pump for pressurizing and delivering a high pressure liquid through the reciprocating motion of a plurality of plungers;

pressure measuring means for measuring the actual delivery pressure value of the high pressure liquid;

a plurality of nozzles for injecting the high pressure liquid;

30 pressure control means for adjusting the feed rate of reciprocating motion of the plungers so that the actual delivery pressure value measured by said pressure measuring means is converged to a preset pressure value as a desired value; and

detecting means for detecting an injection state and a suspension state of the high pressure liquid from each of said nozzles;

35 means for determining an optimum fee rate of the reciprocating motion of the plungers with the control operation of the actual delivery pressure value after reaching a predetermined threshold; and

means for maintaining the feed rate of the reciprocating motion of the plungers constant at said optimum feed rate,

wherein said pressure control means is responsive to the detection of any change between said injection state and suspension state of each of said nozzles by said detecting means so that the feed rate of the reciprocating motion of said plungers is changed to the optimum feed rate corresponding to the injection state and suspension state of each of said nozzles after the change between the injection state and suspension state.

8. A liquid pressurizing device according to claim 2, wherein after said optimum feed rate has been determined, said pressure control means corrects the feed rate on the basis of the deviation between the actual delivery pressure value and said preset pressure value when the direction of the reciprocating motion of the plungers is changed.

9. A liquid pressurizing device according to claim 2, wherein after said optimum feed rate has been determined, said pressure control means temporarily sets the feed rate to a rate higher than said optimum feed rate when the direction of reciprocating motion of the plungers is changed.

10. A liquid pressurizing device according to claim 3, wherein after said optimum feed rate has been determined, said pressure control means temporarily sets the feed rate to a rate higher than said optimum feed rate when the direction of reciprocating motion of the plungers is changed.

11. A liquid pressurizing device according to claim 8, wherein after said optimum feed rate has been determined, said pressure control means temporarily sets the feed rate to a rate higher than said optimum feed rate when the direction of reciprocating motion of the plungers is changed.